Corrigé - Série de TD N02 THL

Exercice 1 :

1. T = {0, b}

   N = {S}

   S : Axiome

   P = {S → 00S , S → Sb , S → ε }

2. ε ∈ L(G) Car S ⊢ ε
   0b ∉ L(G) Car le nombre de zéros doit être paire.
   00b ∈ L(G) Car S ⊢ 00S ⊢ 00Sb ⊢ 00b
   00ab ∉ L(G) Car a ∉ T
   b ∈ L(G) Car S ⊢ Sb ⊢ b
   00 ∈ L(G) Car S ⊢ 00S ⊢ 00

3. L(G) = $\{0^{2i}\, b^{j} \quad i, j >= 0\}$

Exercice 2 :

1. L1 = $\{a^{i}b^{j}a^{2}c^{k}$, i≥0, j≥1, k>0}

   T = {a, b, c} , N = {S, B, C} , S : Axiome ,

   P = { S → aS / B

   B → bB / baaC

   C → cC / c }

2. L2 = {aa, ba, ac, a}

   T = {a, b, c} , N = {S} , S : Axiome , P = { S → aa / ba / ac / a }

3. L3 = { ω, ω∈$\{a, b\}^{*}$ }

   T = {a, b} , N = {S} , S : Axiome , P = { S → aS / bS / ε }

4. L4 = { ω∈{a, b}∗ , $|\omega|_a \equiv 0$ [3]}

   T = {a, b} , N = {S, A, B} , S : Axiome ,

   P = { S → bS / aA / ε

   A → bA / aB

   B → bB / aS }

5. L3 = { $\omega \in \{1, 2, 5\}^*$, $\omega \equiv 0$ [5]}

   T = {1, 2, 5} , N = {S} , S : Axiome , P = { S → 1S / 2S / 5S / 5 }

Exercice 3 :

1. L1 = { $a^{2i}b^i$, $i \geq 0$}

   T = {a, b} , N = {S} , S : Axiome , P = { S → aaSb / ε }

2. L2 = { $\omega\omega^R$, $\omega \in \{a, b\}^+$}

   T = {a, b} , N = {S} , S : Axiome , P = { S → aSa / bSb/ aa / bb }

3. L3 = { $a^ib^jc^i$, $i \geq 1$}

   T = {a, b, c} , N = {S, B} , S : Axiome ,

   P = { S → aSBc / aBc

   cB → Bc

   aB → ab

   bB → bb }

4. L4 = { $a^ib^jc^k$, $k > i \geq j \geq 0$}

   T = {a, b, c} , N = {S, B} , S : Axiome ,

   P = { S → aBSc / aSc / Sc / c

   Ba → aB

   Bc → bc

   Bb → bb }

5. L5 = { $a^ib^jc^k$ / k = max(i, j), i, j≥ 0 }
   L5 = { $a^ib^jc^i$ / $i \geq j \geq 0$ } ∪ { $a^ib^jc^j$ / $j \geq i \geq 0$ }

   T = {a, b, c} , N = {S, S_1, S_2, B_1, B_2} , S : Axiome ,

   P = { S → S_1 | S_2 | ε

   S_1 → aS_1B_1c / aS_1c

   cB_1 → B_1c

   aB_1 → ab

$bB_1 \rightarrow bb$

$S_2 \rightarrow aB_2S_2c \ / \ B_2S_2c$

$B_2a \rightarrow aB_2$

$B_2c \rightarrow bc$

$B_2b \rightarrow bb$ }

6. L6 = { $\omega 0^j \omega$, $\omega \in \{a, b\}^*$, $j \geq 0$ }

T = {a, b, 0} , N = {S, S_1, D, F, A, B} , S : Axiome ,

P = { $S \rightarrow DS_1F$

$S_1 \rightarrow aAS_1 / bBS_1 / \varepsilon$

$Aa \rightarrow aA$

$Ab \rightarrow bA$

$Ba \rightarrow aB$

$Bb \rightarrow bB$

$Da \rightarrow aD$

$Db \rightarrow bD$

$AF \rightarrow Fa$

$BF \rightarrow Fb$

$DF \rightarrow 0DF / \ \varepsilon$ }

Exercice 4 :

• G 1 : $S \rightarrow aA \mid \varepsilon$ ⇒ G1 est de type : 2

$A \rightarrow Sb$

L(G1) = {a^ib^i , i >= 0}

• G 2 : $S \rightarrow AB \mid \varepsilon$ ⇒ G2 est de type : 2

$A \rightarrow aAb \mid ab$

$B \rightarrow bBc \mid bc$

L(G2) = $\{a^i b^{i+j} c^j \quad i,j >=1 \}U\{ \varepsilon \}$

G 3 : $S \rightarrow abS \mid Sbc \mid AB$ ⇒ G3 est de type : 1

$A \rightarrow 0A \mid \varepsilon$

$0Bb \rightarrow 0bb$

L(G3) = $\{(ab)^i 0^j b (bc)^k \quad , i>=0, \ j,k >= 1\}$

G 4 : $S \rightarrow DAF$ ⇒ G4 est de type : 0

$A \rightarrow aAC \mid \varepsilon$

$CF \rightarrow FBc$

$cB \rightarrow Bc$

$aF \rightarrow Fa$

$DF \rightarrow \varepsilon$

$aB \rightarrow ab$

$bB \rightarrow bb$

L(G4) = $\{a^i b^i c^i \ , \ i \ >= 0\}$